

hour, causing entire suspension of shipping business. The water in the river rose to a height of five feet above the ordinary level.

*South Carolina.*—Reports from Stateburg, Sumpter county, state that the tornado of the 23d appeared to have developed near Wateree swamp, first striking a point about one-half mile to the west of the old State road to Charleston. From this place it pursued a course nearly eastward for a distance of five miles, the width being about three hundred yards. Within the track of the storm but few trees were left standing. Along the northern border of the track for a distance of fifty or seventy-five yards, the trees, for the most part, fell from north to south; on the southern border for the same distance they fell from south to north, or from southeast to northwest, and along the centre they fell mostly in a direct line from west to east, while a few were observed to lie from east to west.

Charleston, 23d: In Barnwell county the tornado of this date cut a path three-fourths of a mile in width through the Saltkehatchie swamp, as cleanly as though the timbers had been felled for a railway. Within the storm's path residences and cabins and out-buildings were destroyed on many plantations. Many of the best fields have been so covered with trees and debris that they cannot be cleared in time to be cultivated this year. At Blackville, Barnwell county, a large amount of damage was done by the storm. Nearly everything in its track was blown away or badly damaged. The width of the storm's path was from one-half to three-fourths of a mile, and its duration was about ten minutes.

Bishopville, Sumpter county, 23d: about 8 a. m. of this date a violent wind and rain storm visited this section. The main track of the storm was about one hundred and fifty yards wide, within which trees and buildings were levelled to the ground. So far as has been learned the storm began about four miles west of this place and its track has been followed to Lynch's river.

Saint Stephen's, Berkely county, 23d: during the morning of this date a tornado passed through this section, damaging buildings and blowing down trees.

Darlington, Darlington county, 24th: a tornado coming from a northwest direction and pursuing a zigzag course to the south and east struck this county yesterday. Its track was narrow, and the wind seemed to blow from the borders of the storm towards the centre. Trees, fences and buildings were blown down. The storm was accompanied by vivid lightning, rain and small hail.

*Tennessee.*—Chattanooga, 22d: during the afternoon of this date a tornado passed over this city from southwest to northeast, its main track being about three hundred yards wide and two and one-half miles in length. Diverging from the main storm, a minor track, less than one hundred yards wide, swept around Cameron Hill, rejoining the main track in the northeastern outskirts of the city. The storm continued in full force from 4.40 to 5.10 p. m., with the wind veering rapidly from southeast to northwest, and finally coming around to east at night. The vortical motion of the tornado was clearly shown in the case of a partly finished building facing north-eastward, which was twisted around to the right fully seven feet, and the trees, which also fell from west to east. A large number of buildings were unroofed or otherwise injured, and two cars on the railroad near the river were overturned. The damage to property in this city is estimated at \$10,000.

Knoxville, 23d: The wind and rain storm of last night did but little damage in this locality. The fall of rain (3.75 inches) was the largest that has occurred in any one day at this place during the last five years.

*Texas.*—Sherman, Grayson county, 13th: an unusually severe wind storm struck this place about 12 o'clock last night, doing damage to the extent of several thousand dollars. Several houses were blown down and other were unroofed. The storm lasted for two hours and thirty minutes. Reports from Fort Worth, state that the storm was unusually severe at place.

Dallas, 28th: reports from Bell, Polo Pinto, Hood, Johnson and Fannin counties, state that a severe wind and hail storm passed over those counties during the evening of the 27th, doing great damage to crops, buildings and other property, and causing loss of life. The storm was also severe at Marshall, Harrison county, where several persons were injured. The hail-stones in some places were reported to have been as large as hen's eggs. Among the buildings destroyed were the Masonic hall, the Conatre mills, and one residence. Nearly all of the windows in the town were broken. The storm passed four miles north of Benton, Atascosa county, demolishing houses and doing other damage. Four persons are reported to have been killed.

Fort Davis, 29th: at 4.40 p. m., a violent storm struck this place, blowing down and unroofing several buildings. During the storm the atmosphere was so charged with electricity that it became necessary to disconnect the telegraph instruments from the main line.

*Virginia.*—Richmond: a strong northeasterly gale prevailed here during the 16th and 17th, unroofing a number of buildings and blowing down many trees and fences. On the 22d, a very heavy rain storm occurred, accompanied by a strong northeast wind. The street cars stopped running at 9.30 p. m., on account of the severity of the storm.

## VERIFICATIONS.

### INDICATIONS.

The detailed comparison of the tri-daily indications for April, 1883, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 85.90 per cent. The percentages for the four elements are: weather, 88.72; direction of the wind, 79.43; temperature, 89.13; barometer, 86.14 per cent. By geographical districts, they are: For New England, 84.53; middle Atlantic states, 84.15; south Atlantic states, 86.83; eastern Gulf, 88.28; western Gulf, 88.43; lower lakes, 84.42; upper lakes, 84.60; Ohio valley and Tennessee, 85.48; upper Mississippi valley, 86.20; Missouri valley, 85.92; north Pacific, 92.86; middle Pacific, 81.73; south Pacific, 86.54.

There were sixty-seven omissions to predict (seventeen being due to the absence of reports from the Pacific coast) out of 3,690, or 1.80 per cent. Of the 3,623 predictions that have been made, ninety-four, or 2.59 per cent., are considered to have entirely failed; one hundred and twenty-two, or 3.37 per cent., were one-fourth verified; four hundred and twenty-nine, or 11.84 per cent., were one-half verified; four hundred and forty-four or 12.26 per cent., were three-fourths verified; 2,534, or 60.94 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

### CAUTIONARY SIGNALS.

During April, 1883, one hundred and twenty-four cautionary signals were displayed. Of these, one hundred and thirteen, or 91.1 per cent., were justified by winds of twenty-five miles or more per hour, at or within one hundred miles of the station. Two cautionary off-shore signals were displayed, both of which were justified as to direction and velocity. One hundred and twenty-six signals, of all kinds, were displayed, of which one hundred and fifteen, or 91.3 per cent., were fully justified. These do not include signals ordered at display stations, where the velocity of the wind is only estimated. Eleven signals were ordered late. One hundred and three winds of twenty-five miles or over per hour were reported, for which signals were not ordered; many of these were high local winds or strong sea-breezes.

## NAVIGATION.

### STAGE OF WATER IN RIVERS.

The upper Mississippi river reached its highest stage from the 22d to the 30th, and was lowest during the first part of the month. It was frozen at Saint Paul, Minnesota, until the 6th,